PATENT CLAIMS

1. Servo drive more particularly for motor vehicles with

   - an electromechanical energy converter which has a rotatably mounted disc rotor (1) for generating a torque;

   - a stepping up mechanism (3, 3') on the output side of the disc rotor (1) for coupling the disc rotor (1) to an output element (5) and

   - a locking mechanism which locks a movement of the output element (5) under the action of a torque introduced on the output side into the servo drive

   characterised in that

   the stepping up mechanism (3, 3') and the disc rotor 1 are mounted coaxial relative to each other along an axis (10) and that the locking mechanism has a coil spring (4) which extends on the outer circumference of the stepping up mechanism (3, 3') and/or disc rotor (1).

2. Servo drive according to claim 1, **characterised in that** at least a part of the gear elements (30a, 30b, 31, 33; 25, 30') of the stepping up mechanism (3, 3') is mounted coaxial with the disc rotor (1).

3. Servo drive according to one of the preceding claims, **characterised in that** the coil spring (4) engages round the stepping up mechanism (3, 3') and/or the disc rotor (1) in a plane perpendicular to the axis (10) of the disc rotor (1).

4. Servo drive according to one of the preceding claims, **characterised in that** the movable gear elements (30a, 30b, 30', 31, 32, 33, 34) of the stepping up mechanism (3, 3') serving for stepping up do not radially project over the coil spring (4).

5. Servo drive according to one of the preceding claims, **characterised in that** the coil spring (4) for blocking torque introduced on the output side can be pressed radially against a ring-type brake surface (24).

6. Servo drive according to one of the preceding claims, **characterised in that** the ring type brake surface (24) is mounted or formed on a housing part (2b) for the servo drive.

7. Servo drive according to one of the preceding claims, **characterised in that** the coil spring (4) is mounted to act between a gear element (30b, 30') on the output side of the stepping up mechanism (3,3') and the output element (5) whereby component parts (35, 36; 35', 55a, 56b) connected to the gear element (30b, 30') on the output side or to the output element (5) by acting on the coil spring (4), more particularly its spring ends (41, 42) widen out or compress the coil spring (4).

8. Servo drive according to one of the preceding claims, **characterised in that** the output element (5) surrounds the coil spring (4) pot-shaped.

9. Servo drive according to one of the preceding claims, **characterised in that** the coil spring (4) has two angled spring ends (41, 42) for its actuation.

10. Servo drive according to one of the preceding claims, **characterised in that** the spring ends (41, 42) are each provided with a shift element (43, 44) which is assigned a radial guide (53, 54) and preferably an axial guide (26, 41, 42) with which it can be guided during actuation of the coil spring (4) and that the spring ends (41, 42) can be inserted in radially directed socket openings of the relevant shift element (43, 44).

11. Servo drive according to one of the preceding claims, **characterised in that** the coil spring (4) is pretensioned in the direction of its blocked state.

12. Servo drive according to one of the preceding claims, **characterised in that** the stepping up mechanism (3, 3') with the introduction of torque on the drive side acts on the coil spring (4) and actuates this so that it does not block transfer of torque to the output side.

13. Servo drive according to one of the preceding claims, **characterised in that** the stepping up mechanism (3, 3') with the introduction of torque on the drive side acts through at least one spring end (41, 42) of the coil spring (4) on the output element (5).

14. Servo drive according to one of the preceding claims, **characterised in that** the stepping up mechanism (3, 3') with the introduction of torque on the drive side acts through at least one damping element (45a; 45b, 46a, 46b) on the output element (5).

15. Servo drive according to claim 13 or 14, **characterised in that** between the spring ends (41, 42) of the coil spring (4) and the output element (5) are damping elements (45a, 46b).

16. Servo drive according to claim 14 or 15, **characterised in that** at least one damping element (45a, 45b, 46a, 46b) is deformed when the stepping up mechanism (3, 3') acts on the output element (5).

17. Servo drive according to claim 16, **characterised in that** after relaxation of the deformed damping element (45a, 46a, 45b, 46b) a residual reverse play of the locking mechanism exists until the coil spring (4) is locked.

18. Servo drive according to one of the preceding claims, **characterised in that** through axial and/or radial friction interaction of the stepping up mechanism (3, 3') with the output element (5) a damping effect is achieved when the output element (5) becomes blocked.

19. Servo drive according to claim 18, **characterised in that** a gear element (30b, 30') of the stepping up mechanism (3, 3') interacts wedge like with the output element (5).

20. Servo drive according to one of claims 14 to 17 and claim 20, **characterised in that** a gear element (30b, 30') of the stepping up mechanism (3, 3') and the output element (5) are tensioned axially against each other through the damping elements (45a, 45b, 46a, 46b).

21. Servo drive according to one of the preceding claims, **characterised in that** the gear element (30b, 30') on the output side of the stepping up mechanism (3, 3') and the output element (5) are mounted axially against one another.

22. Servo drive according to claim 21, **characterised in that** the axial bearing is through engagement in an undercut section (52).

23. Servo drive according to claim 21 or 22, **characterised in that** the gear element (30b, 30') on the output side and the output element (5) can be fixed axially relative to each other in the manner of a bayonet lock.

24. Servo drive according to one of the preceding claims, **characterised in that** the stepping up mechanism (3, 3') is formed through a revolving wheel gear.

25. Servo drive according to one of the preceding claims, **characterised in that** the stepping up mechanism (3,3') is formed through a planetary gearing (3) or through a stepping up gear (3') with two coaxial relatively rotatable hollow wheels (25, 30') with internal toothings (i1, i2) with different number of teeth.

26. Servo drive according to one of the preceding claims, **characterised in that** on the axis (10) of the disc rotor (1) is an axially fixed axial securing element (11) mounted between the disc rotor (1) and the output element (5) so that axially acting forces introduced on the output side are taken up by the securing element (11) and do not act on the disc rotor (1).

27. Servo drive according to one of the preceding claims, **characterised in that** when switching off the servo drive the electromechanical converter is short circuited whilst the coil spring (4) is moved into a state in which it adjoins with locking action on the brake face (24) of the servo drive.

28. Servo drive according to one of the preceding claims, **characterised in that** the servo drive has a multi-part housing whose housing parts (2a, 2b, 2c) have a reference point system for the mutual alignment.

29. Servo drive according to one of the preceding claims, **characterised in that** the axis (10) of the disc rotor (1) is supported radially on the output side through a housing part (2c), more particularly in the form of a bearing cover.

30. Servo drive according to one of the preceding claims, **characterised in that** the disc rotor has a number of electrically conductive windings which are to be energised and which are associated with magnets (22) mounted locally fixed for generating torque, and that the magnets (22) are adapted at least in sections in their outer contour (22b) to the path of a winding (W1, W2) in the plane of the disc rotor (1).

31. Servo drive according to claim 30, **characterised in that** the section (22b) of the relevant magnet (22) adapted in its contour (22b) to the path of the windings (W1, W2) is designed in a circular arc.

32. Servo drive according to claim 31, **characterised in that** the outer contour of the magnets (22) is formed by two circular arc sections (22a, 22b) whereby one circular arc section (22b) is adapted to the path of a winding (W1, W2) of the disc rotor (1) which has current flowing through in the same direction, and the other section (22a) restricts the magnets (22) radially inwards in relation to the axis (10)of the disc rotor (1).

33. Servo drive according to claim 32, **characterised in that** the one circular arc section (22b) of the relevant magnet (22) has a smaller radius (R2) than the other circular arc section (22a).

AMENDED PAGE